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- (71) Applicant (for all designated States except US): DSM IP ASSETS B.V. [NL/NL]; Het Overloon 1, NL-6411 TE Heerlen (NL).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): HOSHINO, Tatsuo [JP/JP]; 2-18-14 Fueta, Kamakura-shi, Kanagawa-ken 248-0027 (JP). MIYAZAKI, Taro [JP/JP]; Kameino 2-14-8, Fujisawa-shi, Kanagawa-ken 252-0813 (JP). SUGISAWA, Teruhide [JP/CH]; Inzlingerstrasse 80, CH-4125 Riehen (CH).
- (74) Agent: SCHWANDER, Kuno, Josef; Roche Vitamins Ltd., Patent Department (VMD), Wurmisweg 576, CH-4303 Kaiseraugst (CH).
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- Published:**
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 - before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments
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- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

(54) Title: ALDEHYDE DEHYDROGENASE GENE

(57) Abstract: The present invention relates to a DNA which encodes aldehyde dehydrogenase (SNDH), an expression vector containing the DNA and recombinant organisms containing said DNA. Furthermore, the present invention concerns a process for producing recombinant aldehyde dehydrogenase protein and a process for producing L-ascorbic acid (vitamin C) and/or 2-keto-L-gulonic acid (2-KGA) from L-sorbose by using the recombinant aldehyde dehydrogenase protein or recombinant organisms containing the expression vector. Also provided is a process for the production of 2-KGA with a microorganism in which the gene encoding said aldehyde dehydrogenase is disrupted.

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PATENT COOPERATION TREATY

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INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference Case 21424	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/EP 03/10498	International filing date (day/month/year) 22/09/2003	(Earliest) Priority Date (day/month/year) 27/09/2002
Applicant DSM IP ASSETS B.V.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 6 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the **language**, the International search was carried out on the basis of the International application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ the International search was carried out on the basis of a translation of the International application furnished to this Authority (Rule 23.1(b)).
- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the International application, the International search was carried out on the basis of the sequence listing :
- ☒ contained in the International application in written form.
- ☒ filed together with the International application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
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- ☒ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☒ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of invention is lacking** (see Box II).

4. With regard to the title,

- ☒ the text is approved as submitted by the applicant.
- ☐ the text has been established by this Authority to read as follows:

5. With regard to the abstract,

- ☐ the text is approved as submitted by the applicant.
- ☒ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the drawings to be published with the abstract is Figure No.

- ☐ as suggested by the applicant.
- ☐ because the applicant failed to suggest a figure.
- ☐ because this figure better characterizes the invention.
- ☒ None of the figures.

INTERNATIONAL SEARCH REPORT

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Box III TEXT OF THE ABSTRACT (Continuation of item 5 of the first sheet)

The present invention relates to a DNA which encodes aldehyde dehydrogenase (SNDH), an expression vector containing the DNA and recombinant organisms containing said DNA. Furthermore, the present invention concerns a process for producing recombinant aldehyde dehydrogenase protein and a process for producing L-ascorbic acid (vitamin C) and/or 2-keto-L-gulonic acid (2-KGA) from L-sorbose by using the recombinant aldehyde dehydrogenase protein or recombinant organisms containing the expression vector. Also provided is a process for the production of 2-KGA with a microorganism in which the gene encoding said aldehyde dehydrogenase is disrupted.

INTERNATIONAL SEARCH REPORT

International Application No

EP 03/10498

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C12N9/04 C12N15/52 C12N5/10 C12P7/60

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C12N C12P

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

PAJ, EPO-Internal, EMBL, BIOSIS, WPI Data, SEQUENCE SEARCH, EMBASE

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	SAITO Y ET AL: "Direct fermentation of 2-Keto-L-gulonic acid in recombinant <i>Gluconobacter oxydans</i> " BIOTECHNOLOGY AND BIOENGINEERING. INCLUDING: SYMPOSIUM BIOTECHNOLOGY IN ENERGY PRODUCTION AND CONSERVATION, JOHN WILEY & SONS. NEW YORK, US, vol. 58, no. 2-3, 20 April 1998 (1998-04-20), pages 309-315, XP002204789 ISSN: 0006-3592 figure 4 --- -/--	1-14

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

A document defining the general state of the art which is not considered to be of particular relevance

E earlier document but published on or after the international filing date

L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

O document referring to an oral disclosure, use, exhibition or other means

P document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

& document member of the same patent family

Date of the actual completion of the international search

31 March 2004

Date of mailing of the international search report

16/04/2004

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Schmitz, T

INTERNATIONAL SEARCH REPORT

International Application No

EP 03/10498

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	SAITO Y ET AL: "CLONING OF GENES CODING FOR L-SORBOSE AND L-SORBOSONE DEHYDROGENASES FROM GLUCONOBACTER OXYDANS AND MICROBIAL PRODUCTION OF 2-KETO-L-GULONATE, A PRECURSOR OF L-ASCORBIC ACID, IN A RECOMBINANT G. OXYDANS STRAIN" APPLIED AND ENVIRONMENTAL MICROBIOLOGY, WASHINGTON,DC, US, vol. 63, no. 2, 1997, pages 454-460, XP000886144 ISSN: 0099-2240 the whole document	1-14
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X	EP 0 373 181 A (HOFFMANN LA ROCHE) 20 June 1990 (1990-06-20) the whole document	1-14
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International Application No.

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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A	<p>-----</p> <p>HANCOCK R D ET AL: "Biotechnological approaches for l-ascorbic acid production" TRENDS IN BIOTECHNOLOGY, ELSEVIER PUBLICATIONS, CAMBRIDGE, GB, vol. 20, no. 7, 1 July 2002 (2002-07-01), pages 299-305, XP004361398 ISSN: 0167-7799 the whole document</p> <p>-----</p>	

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